Working Meeting to Address HIPPI-6400 Issues Only
December 2-3, 1996
Minneapolis, MN

1. Opening remarks and introductions

The Chairman, Don Tolmie of Los Alamos National Laboratory, opened this HIPPI-6400 meeting and thanked Horst Truestedt and IBM for hosting this meeting. This group is constituted as both the HIPPI special working group (SWG) under X3T11, and the HIPPI Networking Forum (HNF) - Technical Committee (TC). Don then lead a round of introductions. The list of attendees is at the end of these minutes.

2. Review / modify the draft agenda

The draft agendas were available on the web prior to the meeting. Hard copies were available at the meeting. No changes were requested. James Hoffman is finishing his thesis, and leaving Los Alamos. Don Tolmie volunteered to take the meeting minutes.

3. Review minutes of previous meetings

3.1 November 6-7, 1996, Phoenix, AZ

The Phoenix minutes were reviewed. Roger Ronald requested that phone numbers and e-mail addresses be included in the list of meeting attendees. Don expressed reservations about making everyone's information publicly available, but no one present objected to their information being included.

Don asked if the format of including all of the changed items, and then their disposition, was required. The recommendation was that the minutes should list the contentious issues, and things that were changed differently from the change list in the front of a document – there is no need to duplicate the change list in the minutes.

Greg Chesson moved, an Joe Parker seconded, to approve the minutes as written. Motion passed unanimously.

3.2 Review action items from Phoenix meeting

1. Greg Chesson and Fred Templin to provide ARP text for inclusion in HIPPI-6400-SC, and specify effects on bridging. (Carryover)
2. Greg Chesson to review counter size of SuMAC Retransmission_Error counter and the need for both contiguous retransmission and total retransmission error counters. (Carryover)
3. Michael McGowen to look at bridging and address self discovery concerns with the new MAC Header and start a discussion on email for any unresolved issues. (Overcome by events – use Admin micropackets in HIPPI-6400-SC)
4. Hansel Collins to investigate ways of specifying interoperability voltages by detailing components, parasitics, and parameters at the driving and receiving ends. (Carryover)
5. Greg Chesson to register the EtherTypes with INA / Xerox. (Carryover)
6. Roger Ronald to email the reflector with rewording on VC3 sizing restrictions. (Done, included in -PH 6.2)
7. Wally St. John to present words to reflector describing lack of credit consumption for link level micropackets. (Done)
8. Wally St. John to present the selected Hold-off and Reset / Initialize timer values to Dave Parry. (Done)
9. Greg Chesson to have Art Beckman look into getting a 12-bit group of ULA's for HNF. (In process)
10. Greg Chesson to present text to reflector to describe RTR setup using the Persistent bit. (Carryover)
11. Don Tolmie to review crossing-in-the-night Port_Teardown and End operation cases and review the solution with Wally St. John. (In process)
12. Hansel Collins to find safe operation range for Input High Voltage and Input Low Voltage. (Carryover)
13. Henry Brandt to collect values for completion of copper interface specifications. (Carryover)
14. John Ellis to review suggested connector layout. (Done, included in -PH 15.5)
15. John Ellis to determine retention force of connector. (Carryover)
16. John Ellis to redo values for near end crosstalk. (Carryover)
17. Roger Ronald to update HIPPI-6400-SC Rev 0.5 with changes agreed to at the Phoenix meeting

and incorporate the Admin micropacket draft Rev 0.4. (Done, current Rev is 0.6)

18. Don Tolmie to update HIPPI-6400-ST Rev 0.05 with the changes agreed to at the Phoenix meeting. (Done, current Rev is 0.1)
19. Don Tolmie to update HIPPI-6400-PH Rev 0.71 with the changes agreed to at the Phoenix meeting. (Done, current Rev is 0.85)

4. Review HIPPI-6400-PH changes since last meeting (reference HIPPI-6400-PH Rev 0.85)

The HIPPI-6400-PH changes were reviewed from cover to cover. Interim Rev 0.8 was made available for comment through the web on November 15. Comments were received from Wally St.John, Roger Ronald, and John Ellis, and Rev 0.85, dated November 26, 1996, incorporates these comments.

4.1 Minor changes first and then return to unresolved issues in 4.4

All of the changes listed behind the front cover of Rev 0.85 were approved as written with the following exceptions. There were also some minor editorial changes, but nothing of significance.

In figure 10, show the layout of the 48-bit IEEE ULAs (reference HIPPI-LE figure 7). In the footnote at the bottom of the page, add the web address for the IETF.

In figure 15, add Start Hold-off timer to the right side of the figure. In the last paragraph of 12.3, add in the notion that the Hold-off timer affects Reset as well as Initialize.

In 14.2, add that an implementation may power down its outputs when Clock_2 missing. Add a note that Clock_2 is not used in optical, and another signal may be used instead.

It was suggested that the electrical coupling networks be added to the document since it was felt that they were stable enough now.

4.2 Cable layout (pages 28-29)

In laying out the cable ends, John Ellis of Berg had some problems with crossing wires. He proposed a different layout over e-mail, and Don Tolmie incorporated his layout in Rev 0.85. It was agreed that pins 51 and 100 should be named Chassis Ground (DC) and Chassis Ground (AC) rather than Shield. The only changes to the connector pin assignments would be because the SGI or E-Systems folks found that it was extremely difficult to map to a SuMAC chip, otherwise it seems complete.

4.3 Copper connector issues

Charles Brill of AMP had requested to address the group about possible connector problems, and potentially propose a different connector. Bob Atkinson of AMP presented their MICTOR connector. It is presently used as a board-to-board connector with 25 mil centerline contacts, for 100 ohm differential signals. A variant of this connector may be appropriate for HIPPI-6400, but it would be quite a while before it would be ready. The attendees stated their requirements for something that is available immediately.

The only current question on the Berg connector is whether to use latches or jackscrews. Ed Cady of Berg stated that jackscrews make it easier to build a backshell with an angled cable exit, and that is something we are interested in. Ed also stated that Berg will have cable assemblies ready for testing soon. We will wait for John Ellis of Berg to finish the first cable assemblies, and some cable testing by others, before making a final decision on latches vs. jackscrews. It was suggested that a reaffirmation vote on the Berg connector was in order if we continue to be happy with it.

5. Review HIPPI-ST (reference HIPPI-ST Rev 0.1)

The changes listed in Rev 0.1 were reviewed. There were many editorial changes requested, and some substantial changes agreed to as well.

There was considerable discussion on how to determine the maximum message size when intermediate nodeshave limited buffer capacity. It was agreed to add STUsize parameters in the connection setup; these parameters can be decreased by an intermediate node if the intermediate node does not support the full size. The parameters will be carried in the T_len field. It was agreed that the maximum message size does not need to be the same in both directions.

Rather than having the last eight bytes of the Schedule Header be mandatory payload, and not used with all operations, it was agreed to make the last eight bytes OS_Bufx and OS_Offset. It was also agreed to delete the RTS_Response / CTS operation and carry all of the parameters in a CTS operation (e.g., Blocksize and T_len), negating the need for the

combined operation. The Op values will be changed to fill in the hole left by deleting the RTS_Response/CTS operation.

It was also agreed that in the "Semantics" list, but the common parameters, e.g., S_Port, R_Port, and Key should not be full described in every operation.

all of the operations should include all of the fields used. It was noted that the mapping to HIPPI-6400-PH should specify that a 24-byte HIPPI-6400-PH MAC header immediately followed by a Schedule Header. Roger Ronald stated that he had a description of a HIPPI-6400 to HIPPI-800 translator, and its text may be used as the basis for Annex B. It was also noted that we should include an annex for mapping over Ethernet.

All of the document, except for Annex C, was reviewed, some parts more completely than others, but at least we got all the way through it. Annex C was not reviewed since it had not been updated, and would require additional changes to match the revisions made at this meeting.

6. HIPPI-6400-SC

6.1 Review recent document changes (Referenced Rev 0.6)

Roger Ronald reviewed the changes in HIPPI-6400-SC Rev 0.6. A major change was the addition of the Admin micropackets which had previously been in a separate document. No major contentious issues were raised; a few editorial changes were made. It was noted that the 48-bit addresses should be the same format as used in Ethernet, and this should be stated in the body of the document rather than in an annex.

6.2 ARP alternatives

Fred Templin presented several alternatives: manual configuration, broadcast server, ARP server and NHRP, recommending the latter. NHRP is work in progress in the IP over Non-broadcast Media (ION) working group in the IETF. (NHRP stands for Next Hop Resolution Protocol.) NHRP is a generalization of ARP, designed for switched networks, that uses servers to respond to systems asking for physical addressing information. It includes a scheme to support redundant servers. The servers use a variation of OSPF to keep themselves in synchronism.

John Renwick offered that in order to keep HIPPI-6400 network management simple and foolproof, switches should all implement local broadcast so that ARP could work exactly as it does on Ethernet. To solve the mesh routing problem, switches could implement the IEEE 802.1D MAC-layer bridge protocol and limit broadcasts to other switches.

John Renwick offered the following note after the meeting. After thinking a little about the 802.1D proposal, I believe it's wrong. Although it solves the broadcast problem, it won't produce optimal routes. In a private conversation, Joel Halpern of Newbridge Networks has suggested using another variation of OSPF to determine routes within a mesh of HIPPI switches.

7. HIPPI-6400 MIB

Von Welch was not present at the meeting, nothing was done to the MIB.

8. HIPPI-6400 Optical interconnect

Stan Swirhun of Vixel agreed to provide minutes of the optical portion of this HIPPI-6400 meeting, and they will be in a separate document. In the meantime, Don Tolmie provided this brief summary.

8.1 Review minutes of previous meeting

The minutes of the HIPPI-6400 Optical Working Group for October 8, 1996, in St. Petersburg, Florida, were reviewed. It was noted that Tad Szostak's name was misspelled. With this correction, the minutes were unanimously approved.

8.2 Eye safety update

Michael Griffin presented "Underfilled Launch / N.A. Test Summary with 62.5/125 µm Optical Fiber". A copy of Michael's slides is on the HIPPI web page (at http://www.cic-5.lanl.gov/~det).

Eye safety continues to be a problem. Steve Joiner, and others, pointed out that if we can accept Class III B, then life is a lot simpler, i.e., the optical vendors can build to the Fibre Channel specifications. Very few optical vendors are pursuing parallel fiber Class I due to the extreme receiver sensitivity needed to work with a reasonable loss budget. Various ways to achieve a Class I system using Class III B parts were discussed. It was pointed out that in the HIPPI-6400

application, it is all or nothing, i.e., either all of the fibers are working correctly, and if one is bad then they can all be shut down. Further investigations will be done to determine if a feasible scheme can be achieved, e.g., disable pin(s) on the transmitter chip. The optical parameters for HIPPI-6400 cannot be nailed down until the laser safety issue is resolved.

8.3 Initial connector selection criteria

The connector criteria had been developed at the August meeting in Honolulu, and was in the August and October meeting minutes. The criteria were reviewed. Some parameters could probably be tightened up, but were not critical, e.g., side pull force. The published criteria will continue to be used.

8.4 Connector presentations for MT based connectors

Presentations for connectors that would use the MT ferrule selected at the October meeting in St. Petersburg were made by the following individuals:

Ed Cady, Berg - MiniMAC

Alan Plotts, AMP - LIGHTRAY MPX

Mackie Shiflett, AFL - HI-PER Link

Don Knasel, US Connect - MTP

Some of the presentation material was distributed at the meeting, and will be in the X3T11 February mailing. If people need copies in the meantime, they were instructed to contact Don Tolmie at det@lanl.gov for a printed copy via postal mail.

It was agreed that all of the proposed connectors met the criteria, and further differentiating factors were explored. The plan is to have a short reprise of the connector presentations at the February meeting, and then have a vote to select one connector. The voting rules were questioned, and Don Tolmie stated that the same voting rules as used in X3T11 would be used, but that there were no X3T11 membership requirements.

8.5 Electrical I/O

Steve Joiner presented an updated electrical I/O summary. The goal is to find a common set of voltages, etc. that can be used with a variety of technologies, e.g., PECL and IEEE LVDS/Short. A copy of Steve's slides is on the HIPPI web page.

8.6 Work planning

The preliminary agenda for the Tuesday, February 4, 1997, HIPPI-6400 Optical Meeting, in San Jose, 2 PM - 4 PM, was drafted.

Review minutes of Minneapolis meeting
Eye Safety
Open Fiber Control
Electrical I/O specifications
Connector reprise (10 minutes each)
Connector vote
Planning

9. Future meeting schedule

9.1 January 7-9, 1997, Phoenix, AZ

The meeting will cover HIPPI-6400 issues, with emphasis on copper on Wednesday. At one time this had been scheduled as a 2-day meeting; note that it is now a 3-day meeting.

Tuesday, January 7 — 1 PM - 9 PM
Wednesday, January 8— 8 AM - 9 PM
Thursday, January 9— 8 AM - 5 PM

The location is on the Courtyard by Marriott at the Phoenix Airport. Chris Olson and Lockheed Martin are the host. (See the meeting announcement on the web page at http://www.cic-5.lanl.gov/~det/ for further details.)

9.2 February 3-4, 1997, San Jose, CA

During the X3T11 February plenary week , the following HIPPI meetings are scheduled:

Monday, February 3-
9 AM - 9 PM — HIPPI-6400

Tuesday, February 4 -
8 AM - 9 AM — HNF Plenary
9 AM - 2 PM — HIPPI-TC General and -6400
3 PM - 5 PM — HIPPI-6400 Optical (with connector selection)
6 PM - 9 PM — HIPPI-6400 General

The location is the Red Lion Hotel, 2050 Gateway Place, San Jose, CA 95110. Bob Snively and Sun Microsystems are the host. (See the meeting announcement on the web page at http://www.cic-5.lanl.gov/~det/ for further details.)

9.3 Move May '96 meeting to May 14-15

The May 1996 meeting had been moved from May 7-8 to April 30 and May 1 to avoid a conflict that Don Tolmie had. Now it seems that there is a conflict with the European HPCN conference, and it may affect several of our regular attendees. The May host, Greg Chesson and SGI, did not have any problems with moving the meeting date, and neither did anyone else. Hence, the May 1997 meeting date has been moved to May 14-15.

9.4 Future meeting dates and locations

The following 1997 X3T11 plenary week dates are shown below. Note the date changes for the January, May and December meetings, and the location change for the March meeting. Recent changes to this list are underlined to make them easier to find.

1997 –

Jan 7-9	Interim	Phoenix, AZ	Lockheed
Feb 3-4	Plenary	San Jose, CA	Sun
Mar 5-6	Interim	San Jose, CA	Berg
Apr 7-8	Plenary	Palm Springs, CA	Brocade
May 14-15	Interim	Mt. View	SGI
Jun 9-10	Plenary	Seattle, WA	Boeing
July 9-10	Interim	Minneapolis, MN	Cray
Aug 4-5	Plenary	Honolulu, HI	Hitachi
Oct 6-7	Plenary	Tucson, AZ	FSI
Dec 8-9	Plenary	Orlando, FL	DPT

The 1998 schedule is less firm, but here is what is currently being considered by X3T11 for the plenary meetings. Question marks note the ones that are still in question. Hopefully HIPPI-6400 will be far enough along that we will not need interim working meetings.

1998 –

Feb 9-10	Plenary	San Diego	Qlogic
Apr 20-21	Plenary	Palm Springs, CA	Brocade
Jun 8-9	Plenary	St. Petersburg Beach, FL	AMP
Aug 10-11	Plenary	??	??
Oct 5-6	Plenary	Tucson, AZ (?)	FSI (?)
Dec 7-8	Plenary	Ft. Lauderdale, FL	Adaptec

10. Review action items

All of the following action items apply to HIPPI-6400.

1. Greg Chesson and Fred Templin to provide ARP text for inclusion in HIPPI-6400-SC, and specify effects on bridging.
2. Greg Chesson to review counter size of SuMAC Retransmission_Error counter and the need for both contiguous retransmission and total retransmission error counters.
3. Hansel Collins to investigate ways of specifying interoperability voltages by detailing components, parasitics, and parameters at the driving and receiving ends.
4. Greg Chesson to register the EtherTypes with INA / Xerox.
5. Roger Ronald to email the reflector with rewording on VC3 sizing restrictions.
6. Greg Chesson to have Art Beckman look into getting a 12-bit group of ULA's for HNF.
7. Greg Chesson to present text to reflector to describe RTR setup using the Persistent bit.
8. Don Tolmie to review crossing-in-the-night Port_Teardown and End operation cases and review the solution with Wally St. John.
9. Hansel Collins to find safe operation range for Input High Voltage and Input Low Voltage.
10. Henry Brandt to collect values for completion of copper interface specifications.
11. John Ellis to determine retention force of connector.
12. John Ellis to redo values for near end crosstalk.
13. Roger Ronald to update HIPPI-6400-SC Rev 0.6 with changes agreed to at the Minneapolis meeting.
14. Don Tolmie to update HIPPI-6400-ST Rev 0.1 with the changes agreed to at the Minneapolis meeting.
15. Don Tolmie to update HIPPI-6400-PH Rev 0.85 with the changes agreed to at the Minneapolis meeting.
16. Michael Karg to find the international cable specification for plenum rating.
17. Greg Chesson and Don Sanders to have SGI review the connector layout as it relates to the SuMAC chip.
18. Greg Chesson to see if we can make 8.7 and 8.1 in -ST consistent, i.e., 0 or -1 for S_id and T_id don't care values.
19. Greg Chesson and Don Sanders to check all error states, e.g., what happens if a command is corrupted or lost.
20. Roger Ronald to draft -ST over HIPPI-FP so that we can see if it obviates the need for HIPPI-MP.

11. Adjournment

The group adjourned at 5 PM.

12. Attendance

Jeff Conley	3M	512-984-6989	jconley1@mmm.com
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